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# RS485 I/O Expansion System

June 10, 2015

USER GUIDE

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RS485 I/O Expansion System User Guide
June 10, 2015

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# 1 Preface

Thank you for choosing the RS485 I/O Expansion System. This I/O expansion solution is designed for use with any Modbus RS485 Master device as a standalone system. This System follows the Modbus Application Protocol Specification, v1.1b3, for Data Encoding with values represented in Big-Endian format or MSB first (word order).

Digital/Discrete, Analog 4-20 mA, or Analog 0-10 V are available for use with the RS485 I/O Expansion System. This System provides fast, accurate, reliable I/O's and requires no software programming, making it extremely easy and quick to use.

To interface with a RS485 Master device, the System utilizes a RS485 I/O Expansion Module that transfers I/O signals between Modbus Master and connected I/O Modules. The RS485 Module also distributes power to the I/O Modules allowing for single point power termination.

This document is designed to guide you through setting up the system by familiarizing you with the hardware, installation, wiring, and overall system management.

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## 1.1 Compliances

- Changes or modifications not expressly approved by the manufacturer may void the user's authority to operate the equipment.

**Warning:** Ensure system installation meets applicable state and national electrical code requirements. The installation of the system should only be performed by a qualified installer or a factory representative.

**Warning:** To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

**Caution:** The RS485 I/O Expansion System must be installed within an enclosure that requires a tool to access. This is to prevent inadvertent disconnection of any of the power wiring, signal wiring or communication cables.

**Caution:** EXPLOSION HAZARD. Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

**Caution:** EXPLOSION HAZARD. Do not remove or replace fuse when energized.

**Note:** This equipment is designed for use in Class I, Division 2 (Zone 2) or non-hazardous locations only.

# 2 System Overview

## 2.1 Highlights

- Local I/O expansion solution for use with any RS485 Modbus Master device.
- System utilizes a pass-through RS485 Interface/Module for transferring I/O signals between Modbus Master and connected I/O Modules
- One RS485 Expansion I/O Module supports multiple Wireless I/O Modules.

  System can support up to sixteen (16) Digital Modules

  System can support up to eight (8) 0-10 V Modules

  System can support up to five (5) 4-20 mA Modules

  ⚠ When adding more than five (5) I/O Modules and mixing different I/O Modules, please determine maximum allowable I/O Module combination per system by utilizing the power budget calculator: http://psft.com/A7U
- Supports Digital, 0-10 V, and 4-20 mA Modules in any combination.
- Each I/O Module provides field isolated inputs and outputs.
- Easy to use: no software configuration required.
- System attaches onto 35 mm x 7.5 mm DIN rail with easy, clip-on mounting system.
- Reduced wire clutter: single power termination.
- Wiring label provided on each Module for quick reference.
- All Modules are color-coded for quick reference and identification.
- The same I/O Modules can also be used for wireless application with Wireless I/O Radio Kit.
- Reduced wire clutter: single power termination.
- Quick wiring reference label provided on each Module.
- Wireless I/O System can support multiple I/O Modules.

  System can support up to sixteen (16) Digital Modules max.

  System can support up to eight (8) 0-10 V Modules max.

  System can support up to five (5) 4-20 mA Modules max.

**Warning:** When adding more than five (5) I/O Modules and mixing different I/O Module combinations, please determine the maximum allowable I/O Module combination per system by utilizing the power budget calculator. See http://psft.com/A7U

## 2.2 Hardware

1. RS485 I/O Expansion Module: BM-1000-PM1 (US), BM-0915-RM1 (Int), BM-2400-RM1 (US), BM-2410-RM1 (Int)
2. Digital Module: BM-D100-144 (US); BM-D100-244 (International)
3. 4-20 mA Analog Module: BM-A420-122 (US); BM-A420-122 (International)
4. 0-10 V Analog Module: BM-A010-122 (US); BM-A010-122 (International)

5. DataRail attaches onto 35 mm x 7.5 mm DIN rail (Standard length included in Radio Kit can support 1 RS485 I/O Expansion Module + 5 I/O Modules)
6. End Terminal Bracket for securing DataRail and Modules to DIN Rail
7. DataRail Cover for protecting empty DataRail slots

# 3 Specifications

## 3.1 Hardware and System

| HARDWARE & SYSTEM | |
|---|---|
| Unique Features | Works with Any Modbus RS485 Master Device<br>No Software Configuration Required<br>Single Point Power Termination |
| Maximum Network Capacity* | System can support up to sixteen (16) Digital Modules max<br>System can support up to eight (8) 0-10 V Modules max<br>System can support up to five (5) 4-20 mA Modules max<br><br>When adding more than five (5) I/O Modules and creating different I/O Module combinations, please determine maximum allowable I/O Module combination per system by utilizing the power budget calculator. |
| Power Budget Calculator | http://psft.com/A7U |
| Data Encoding Method | MSB First |
| I/O Module Slave ID Selection | 16-Position Rotary Switch (+1 for Modbus Slave ID) |
| DIN Rail Mounting Compatibility | 35 mm x 7.5 mm DIN Rail |
| DataRail™ (Included w/ Kit) | 6.1" / 156 mm - Supports Up to Exp. + 5x I/O Modules |
| Auto-Detection of Modules | Yes, via DataRail at Power-Up |
| DataRail Mounting Hardware | 4-Claw Attachment to 35 mm DIN Rail with End Terminal Bracket |
| Built-In Mounting Hardware | Spring-Loaded Clip-On System |
| Wire Gauge | Solid / Stranded (AWG) 28-12 Gauge |
| Wire Rating | UL: 300 V RMS, 80 °C and 300 V, 105 °C<br>CSA: 300 V RMS, 105 °C |
| Warranty | 2-Year Limited |

## 3.2 Safety and Compliance

| SAFETY & COMPLIANCE | RADIO |
|---|---|
| Operational Temperature | -40 °C to 85 °C / -40 °F to 185 °F |
| Ambient Temperature | -20 °C to 85 °C / -4 °F to 185 °F |
| Humidity | 0 to 99 %, Non-condensing |
| Degree of Protection / Housing Type | IP20 / Plastic |
| Hazardous Locations Classifications | Class I; Division 2 (Zone 2), Pending |

## 3.3 RS485 Expansion I/O Module

| RS485 Expansion I/O Module | |
|---|---|
| Baud Rate | 9600 bits per second |
| Data Bits | 8 |
| Parity / Stop Bits | None / 1 |
| RS485 Modbus Slave Addressing | Interface Supports up to 16 Addresses / I/O Modules* |
| Red LED (Left) | Power |
| Green LED (Right) | USB-Ready (For Firmware Update) |
| Supply Voltage Range | 9 - 30 VDC (± 5 %) |
| Protection Against Polarity | Yes |
| Power Consumption | Typical: 20 mA / Max: 24 mA @12 VDC |
| Packaging Dimensions (WxHxD) | 5.5 x 10.1 x 2.8-in / 140 x 257 x 72mm |
| Net Dimensions (WxHxD) | 0.7 x 3.9 x 4.5-in / 17.5 x 99 x 114mm |
| Packaging Weight | 0.8 lbs / 363 g |
| Net Weight | 0.3 lbs / 136 g |

## 3.4 Digital I/O Module

| Digital I/O Module | |
|---|---|
| Number of Inputs | 4 |
| Number of Outputs | 4 |
| Isolation Voltage | 2500 V r.m.s. |
| Input Voltage Range | 3-30 VDC |
| Input Voltage Threshold | 1 Signal ("H"): > 2.3 VDC |
| | 0 Signal ("L"): < 1.1 VDC |
| Output Rating | 1 A Sink Current for Open-Drain Outputs / NPN |
| Green LEDs | Input Indicators |
| Red LEDs | Output Indicators |
| Power Consumption | Typical: 18 mA / Max: 26 mA @12 VDC |
| Packaging Dimensions | (WxHxD) 4.8 x 5.1 x 2.8-in / 123 x 129 x 72mm |
| Net Dimensions | 0.7 x 3.9 x 4.5-in / 17.5 x 99 x 114mm |
| Packaging Weight | Single: 0.5 lbs / 227 g; Double: 0.8 lbs / 363 g |
| Net Weight (Single) | 0.3 lbs / 136 g |

## 3.5 4-20 mA I/O Module

| Analog 4-20 mA I/O Module | |
|---|---|
| Number of Inputs | 2 (24-bit Resolution) |
| Number of Outputs | 2 (16-bit Resolution) |
| Isolation Voltage | 2500 V r.m.s. |
| Signal Range | 4 mA to 20 mA |
| Accuracy | < 0.28 % of Full Scale |
| Internal Loop Power | +13.5 VDC |
| AI Input Impedance (loop) | 128 Ohm |
| AO Terminal Voltage Range | 10 VDC Min. / 31.5 VDC Max. |
| Power Consumption | Typical: 50 mA / Max: 75 mA @12 VDC |
| Packaging Dimensions | (WxHxD) 4.8 x 5.1 x 2.8-in / 123 x 129 x 72mm |
| Net Dimensions | 0.7 x 3.9 x 4.5-in / 17.5 x 99 x 114mm |
| Packaging Weight | Single: 0.5 lbs / 227 g; Double: 0.8 lbs / 363 g |
| Net Weight (Single) | 0.3 lbs / 136 g |

## 3.6 0-10 V I/O Module

| Analog 0-10 V I/O Module | |
|---|---|
| Number of Inputs | 2 (24-bit Resolution) |
| Number of Outputs | 2 (16-bit Resolution) |
| Isolation Voltage | 2500 V r.m.s. |
| Signal Range | 0 VDC to 10 VDC (10.5 V Max) |
| Accuracy | < 0.1 % of Full Scale |
| AI Input Impedance | 40K Ohm |
| AO Output Impedance | 10 Ohm |
| Power Consumption | Typical: 40 mA / Max: 45 mA @12 VDC |
| Packaging Dimensions | (WxHxD) 4.8 x 5.1 x 2.8-in / 123 x 129 x 72mm |
| Net Dimensions | 0.7 x 3.9 x 4.5-in / 17.5 x 99 x 114mm |
| Packaging Weight | Single: 0.5 lbs / 227 g; Double: 0.8 lbs / 363 g |
| Net Weight (Single) | 0.3 lbs / 136 g |

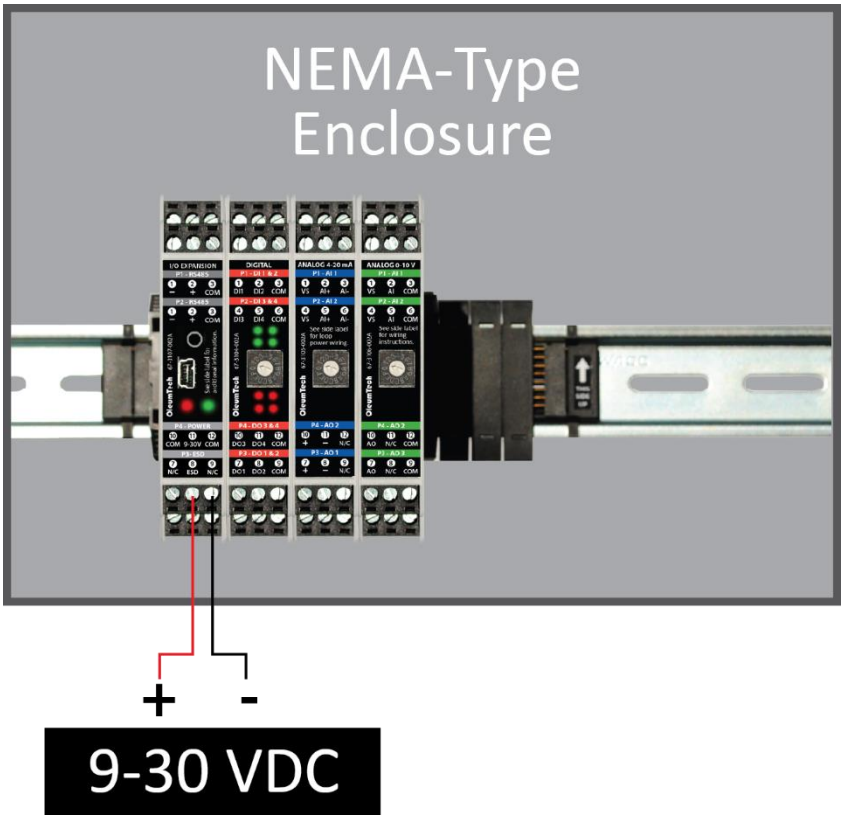
## 3.7 Ordering Information

| ORDERING INFORMATION | RS485 |
|---|---|
| RS485 Expansion Kit | BM-1000-PM1K |
| Kit Content | RS485 Expansion I/O Module, DataRail,<br>2x End Terminal Brackets, DataRail Cover,<br>Quick Start Guide, Technician's Screwdriver |
| Digital I/O | 1-Pack: BM-D100-144S |
| | 2-Pack: BM-D100-144D |
| 4-20 mA I/O | 1-Pack: BM-A420-122S |
| | 2-Pack: BM-A420-122D |
| 0-10 V I/O | 1-Pack: BM-A010-122S |
| | 2-Pack: BM-A010-122D |

# 4 Installation

## 4.1 Outdoor Enclosure Installation

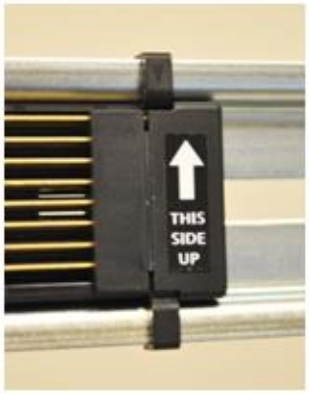
1. Install or use existing outdoor NEMA-type enclosure.
2. Be sure the RS485 I/O Expansion System meets applicable grounding requirements in the enclosure.
3. Install a 35 mm x 7.5 mm DIN rail (at least 166 mm (6.5-inch) wide) inside the enclosure.
4. Provide external power supply: 9-30 VDC.
5. Make a hole on the bottom of the enclosure to run wires.
6. Run conduit for power and I/O cabling.
7. Feed power wiring into enclosure.
8. Terminate RS485 wiring.



## 4.2 RS485 I/O Expansion System Assembly

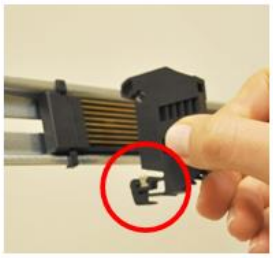
**Warning:** Power must be disconnected or turned off prior to attaching or removing any I/O Modules from the system – failure to comply may cause damage hardware.

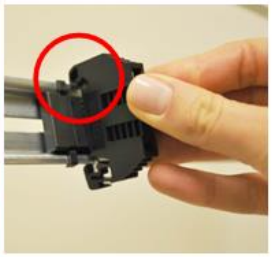
1. Securely attach the DataRail onto a 35 mm x 7.5 mm DIN rail by gently pressing on all four (4) corner clips.




2. Secure DataRail to DIN rail by attaching an End Terminal Bracket.

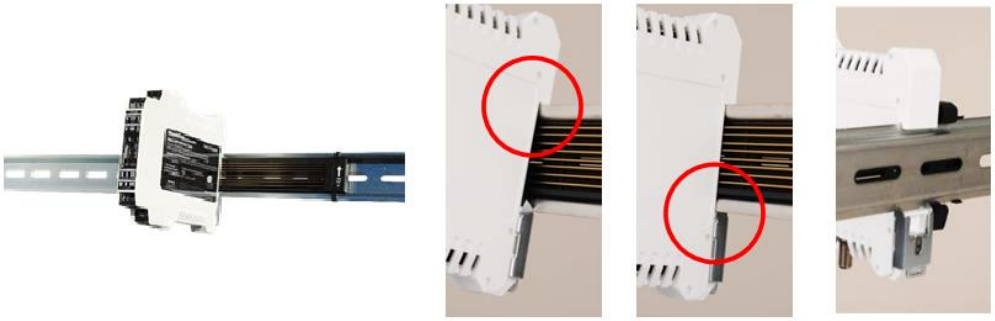
   a. First, hook the metal end of the Bracket to DIN rail and then snap the other end onto the DIN rail. (Make sure to position the Bracket on the far left of the DataRail where metal blades meet the plastic).





3. Attach RS485 I/O Expansion Module to DataRail (place it next to the Bracket without any gap).

   a. First, latch the top hook onto the rail, then snap-in the spring-loaded clip into place.

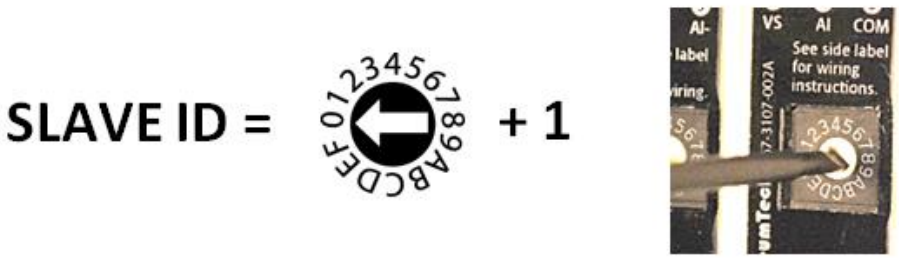


4. Attach I/O Module(s) to the system.

   a. Place Modules in any combination (do not leave gaps between Modules).

   b. When using more than five (5) I/O Modules, determine maximum I/O Module combination by using power budget calculator: http://psft.com/A7U

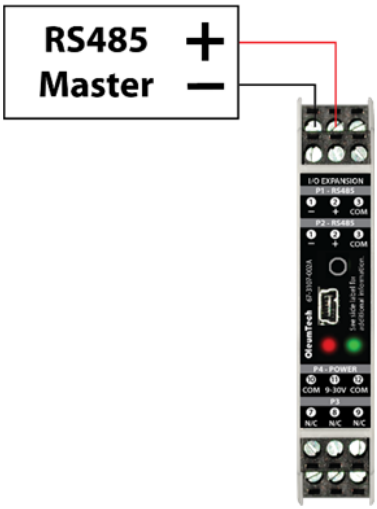
   c. Use the 16-position switch located on the front of each I/O Module to set the Modbus Slave ID(s). Slave ID = Switch position number + 1.
   Ex: Switch ID 0 + 1 = Slave ID 1




5. Attach the other End Terminal Bracket to secure the Modules. (Place it next to the last module without leaving a gap)

6. Protect any unused DataRail slots with the cover. Snap-off extra pieces and store for future use.

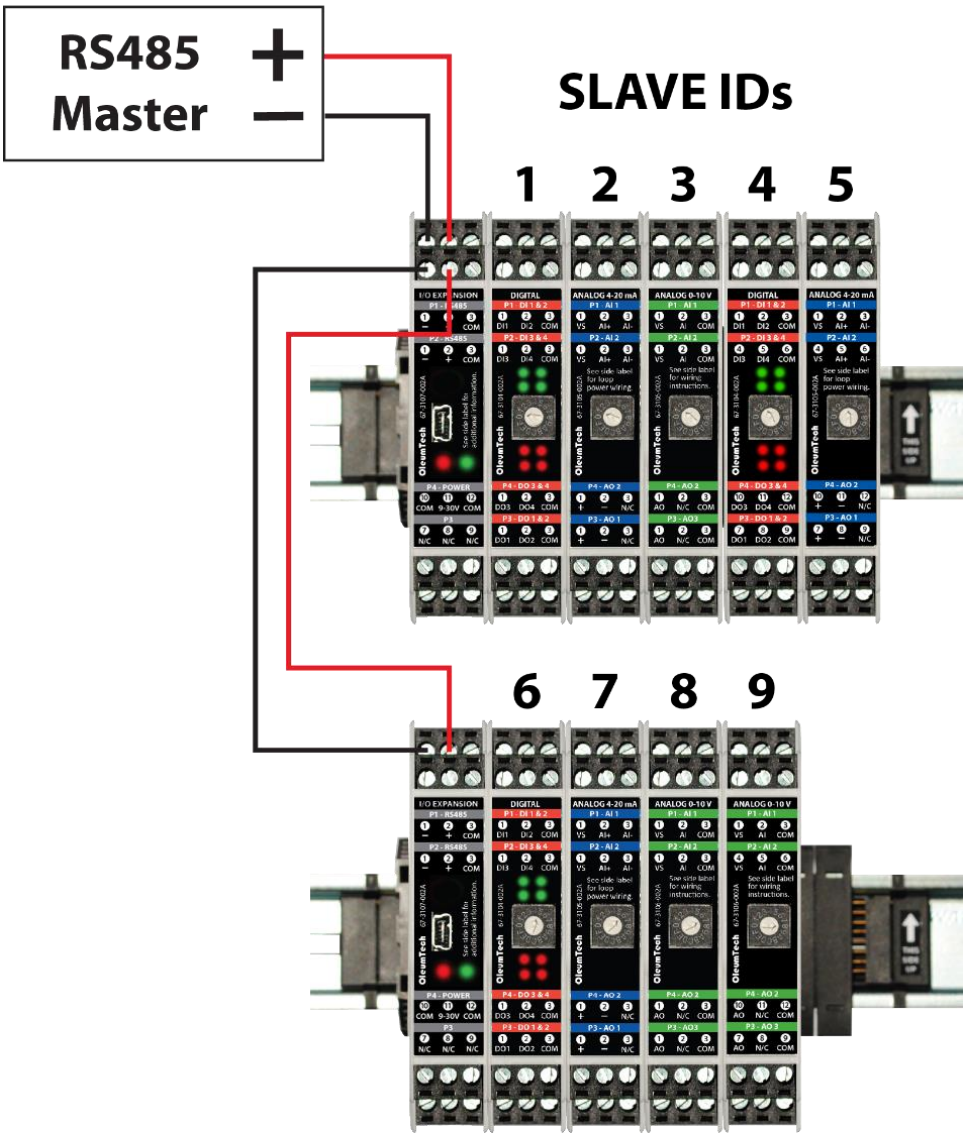
7. Terminate the RS485 terminals.




8. Terminate I/O and supply power as required. Use solid or stranded wire (AWG) 28-12.

## 4.3 RS485 Daisy-Chain Diagram

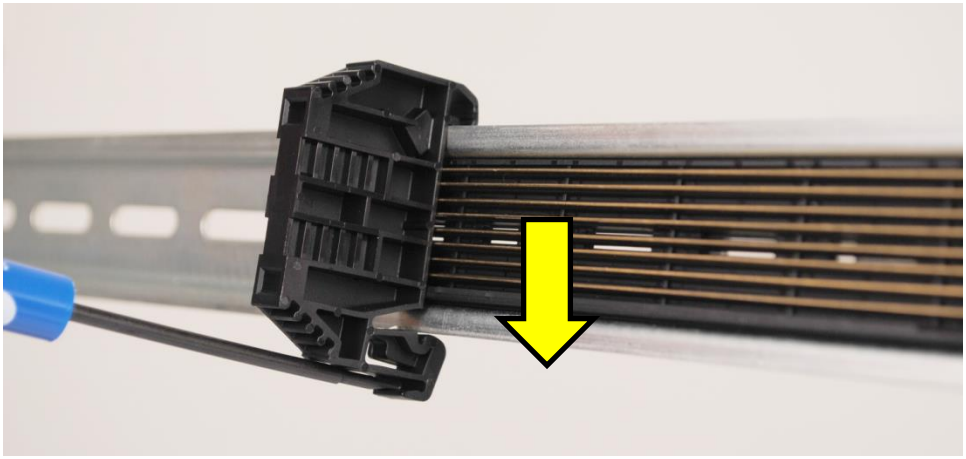
1. If more I/O Modules are required, another RS485 I/O Expansion Module (Kit) set can be deployed simply using the daisy-chain method.
2. The System holds up to 16 I/O Module Slave addresses regardless of the number of RS485 I/O Expansion Modules deployed.
3. Each Module must be set to a unique Modbus Slave address.



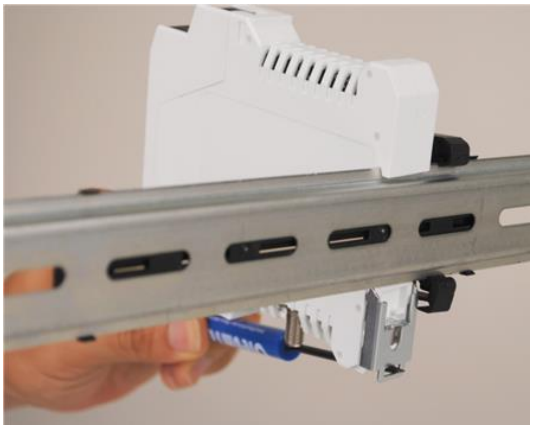
## 4.4 Detaching Components from the DataRail

**Warning:** All live wiring connections and power must be safely disconnected before taking any components off the DataRail or Wireless I/O System!

1. The End Terminal Bracket can be removed from the DIN rail by inserting the tip of a flathead screwdriver into the removal slot. Control the direction with the screwdriver handle to pull the latch away from the DIN rail.



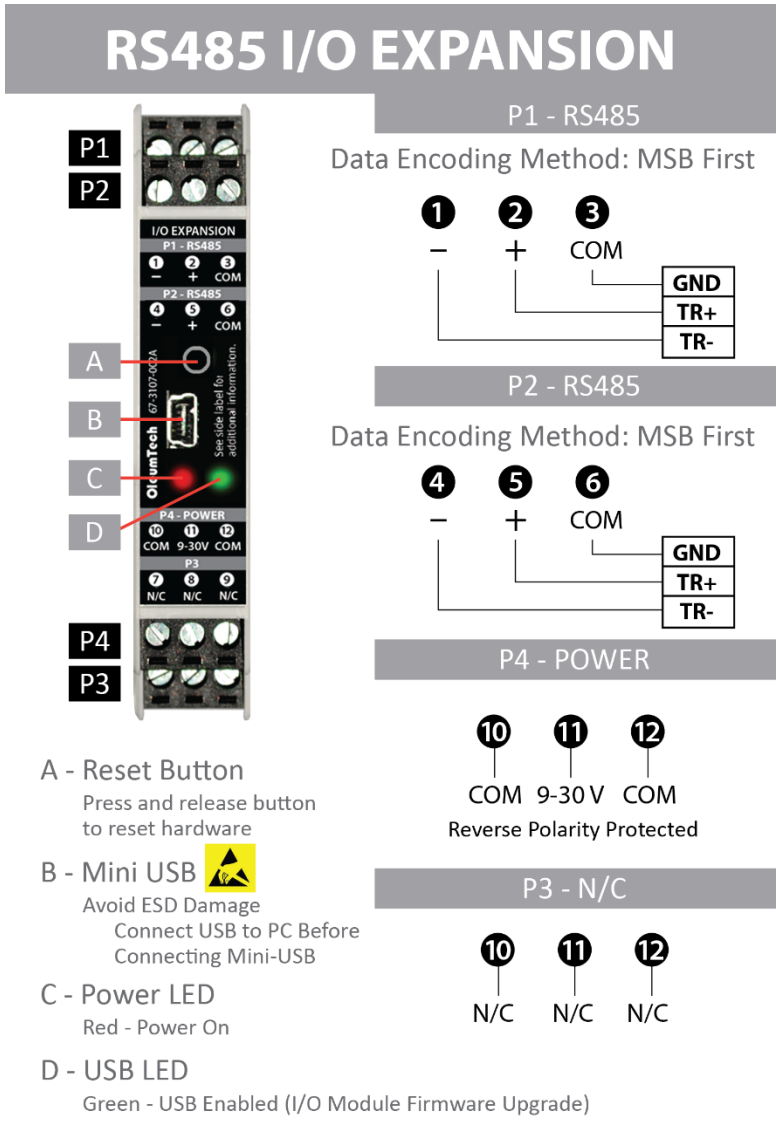
2. Wireless I/O Modules can be removed from the DIN rail by inserting the tip of a flathead screwdriver into removal slot located on the metal clip. Lift-up on the screwdriver handle to pull the spring-loaded clip away from the DIN rail.



# 5 Wiring Diagrams

## 5.1 RS485 I/O Expansion Module

(BM-1000-PM1 Shown)




Data Encoding Method (Word Order):

MSB First

Data Encoding Method (Word Order):

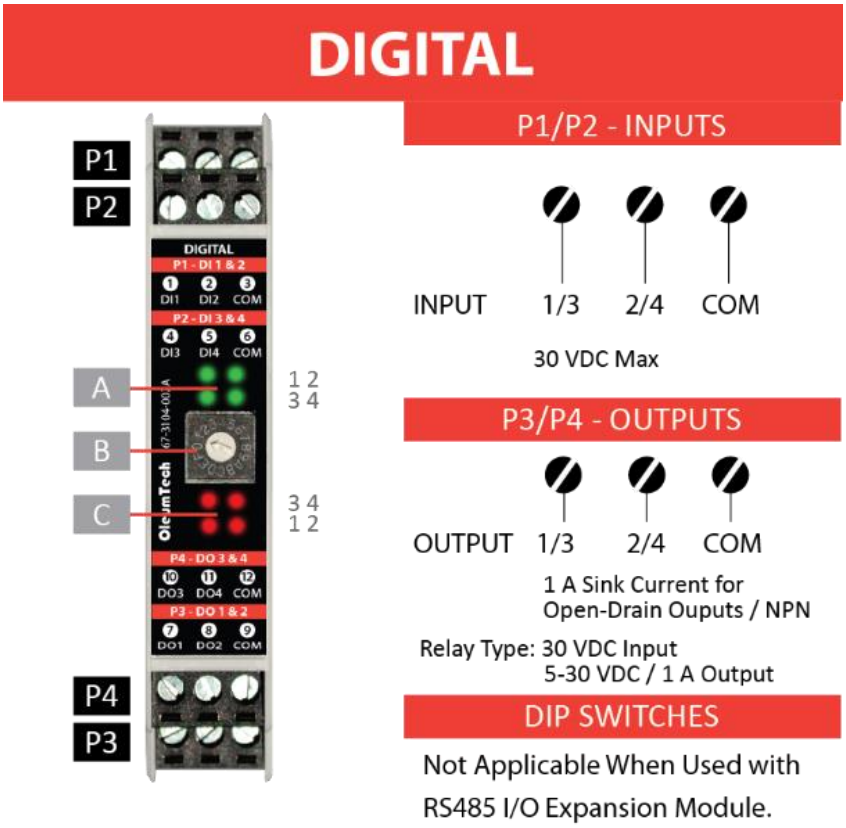
MSB First

Use Solid / Stranded (AWG) 28-12 Wire Gauge

RS485 I/O Expansion Module does not share a common ground with I/O Modules. All inputs and outputs on I/O Modules provide field isolation.

## 5.2 Digital Module

(BM-D100-144 Shown)



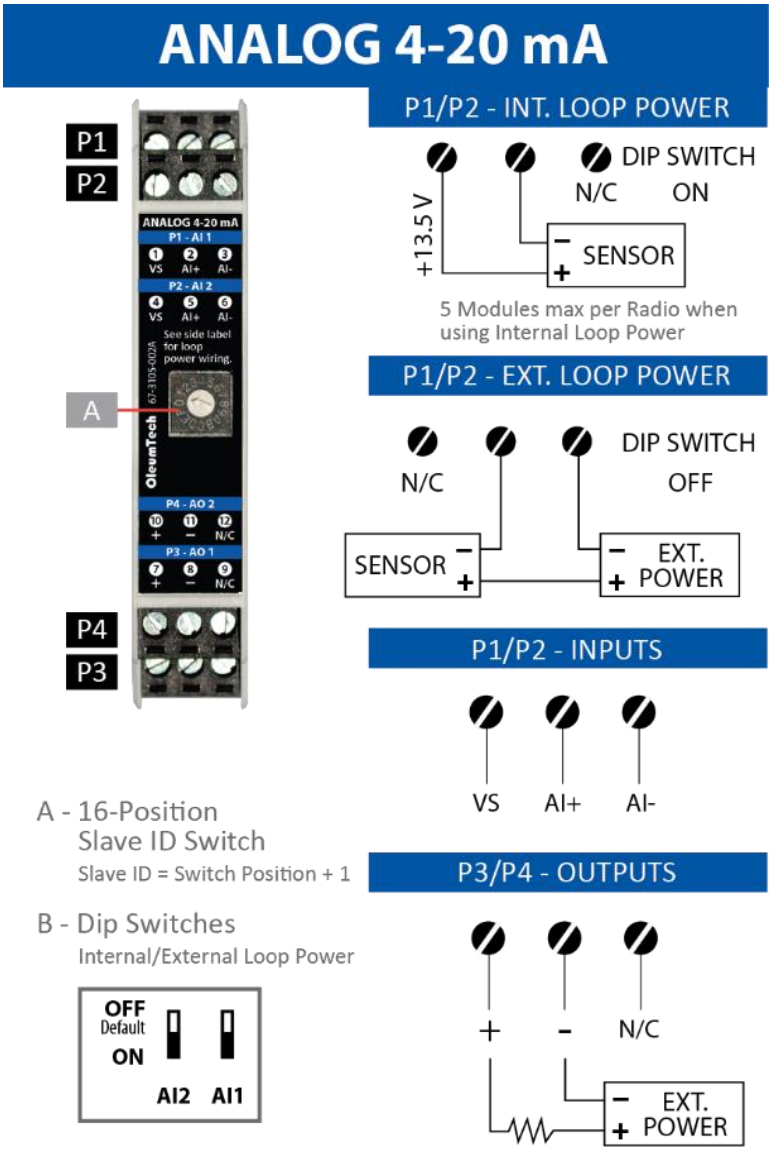

Use Solid / Stranded (AWG) 28-12 Wire Gauge

Digital I/O Module does not share a common ground with RS485 Module. All inputs and outputs on I/O Modules provide field isolation.

If input sensor is powered from the same source as RS485 Module, be sure to establish a common ground, otherwise sensor will not work properly.

## 5.3 Analog 4-20 mA Module

(BM-A420-122 Shown)



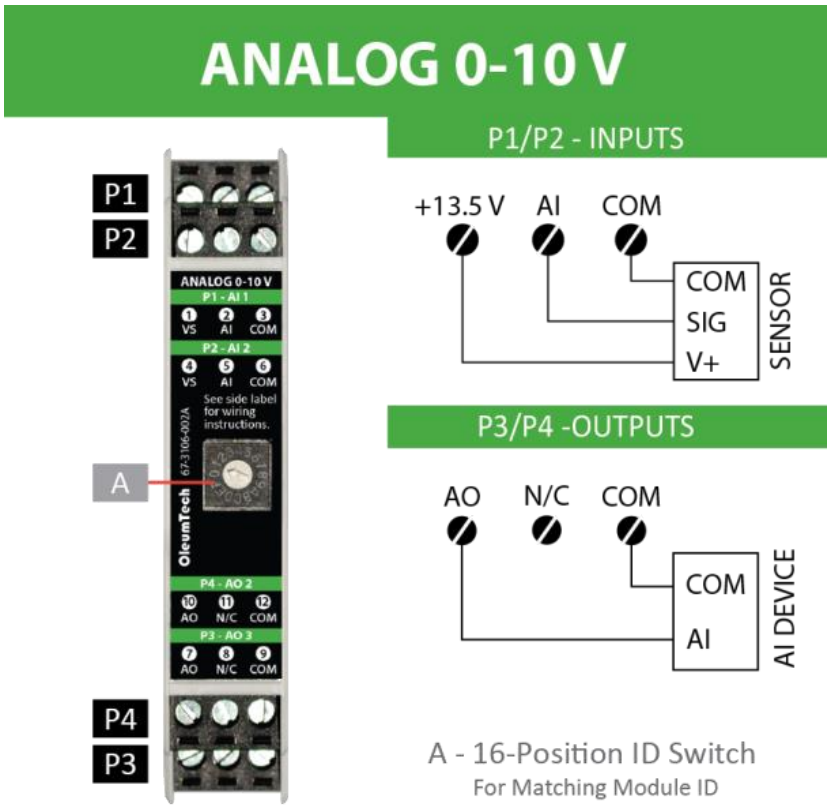

VS/External Power (min) = 10 + Max Current (Amp) * $R_{loop}$
$R_{loop}$ = Total Loop Impedance

Use Solid / Stranded (AWG) 28-12 Wire Gauge

4-20 mA I/O Module does not share a common ground with RS485 Module. All inputs and outputs on I/O Modules provide field isolation.

## 5.4 Analog 0-10 V Module

(BM-A010-122 Shown)




Use Solid / Stranded (AWG) 28-12 Wire Gauge

0-10 V I/O Module does not share a common ground with RS485 Module.
All inputs and outputs on I/O Modules provide field isolation.

# 6 Modbus Mapping

## 6.1 Supported Modbus Function Codes

| Supported Function Codes | Definitions | Applicable Module(s) |
|---|---|---|
| 0x01 | Read Coils | Digital |
| 0x02 | Read Discrete Inputs | Digital |
| 0x03 | Read Holding Registers | Digital, 4-20mA, 0-10 V |
| 0x05 | Write Single Coil | Digital |
| 0x06 | Write Single Register | Digital, 4-20mA, 0-10 V |
| 0x10 | Write Multiple Registers | Digital, 4-20mA, 0-10 V |
| 0x0F | Write Multiple Coils | Digital |

## 6.2 Digital I/O Module – Modbus Mapping Table

| Modbus Function | Address | Description | Access | Type | Range |
|---|---|---|---|---|---|
| 0x01 | 1..4 | Discrete Output 1..4 | Read | BIT | 4321 |
| 0x02 | 1..4 | Discrete Input 1..4 | Read | BIT | 4321 |
| 0x05, 0x0F | 1..4 | Discrete Output 1..4 | Write | BIT | 0xFF00/0x0000, ----4321 |
| 0x03, 0x06, 0x10 | 3001..3004 | Discrete Input 1..4 | Read | UINT 16 | 0..1 |
| 0x03, 0x06, 0x10 | 3005..3008 | Discrete Output 1..4 | Read/Write | UINT 16 | 0..1 |

## 6.3 4-20 mA I/O Module - Modbus Mapping Table

| HR | Description | Access | Type | Range |
|---|---|---|---|---|
| 3001 | Analog Input 1 Current /1000 | Read | UINT 16 | 4000..20,000 |
| 3002 | Analog Input 2 Current /1000 | Read | UINT 16 | 4000..20,000 |
| 3003 | Analog Input 1 Raw Split-Hi | Read | UINT 32 | 0..8,388,607 |
| 3004 | Analog Input 1 Raw Split-Lo | | | |
| 3005 | Analog Input 2 Raw Split-Hi | Read | UINT 32 | 0..8,388,607 |
| 3006 | Analog Input 2 Raw Split-Lo | | | |
| 3007 | Analog Input 1 Current Split-Hi | Read | IEE FLOAT | 4.0..20.0 |
| 3008 | Analog Input 1 Current Split-Lo | | | |
| 3009 | Analog Input 2 Current Split-Hi | Read | IEE FLOAT | 4.0..20.0 |
| 3010 | Analog Input 2 Current Split-Lo | | | |
| 3011 | Analog Output 1 Current /1000 | Read/Write | UINT 16 | 0..20,000 |
| 3012 | Analog Output 2 Current /1000 | Read/Write | UINT 16 | 0..20,000 |
| 3013 | Analog Output 1 % /100 | Read/Write | UINT 16 | 0..10,000 |
| 3014 | Analog Output 2 % /100 | Read/Write | UINT 16 | 0..10,000 |
| 3015 | Analog Output 1 Current Split-Hi | Read/Write | IEE FLOAT | 4.0..20.0 |
| 3016 | Analog Output 1 Current Split-Lo | | | |
| 3017 | Analog Output 2 Current Split-Hi | Read/Write | IEE FLOAT | 4.0..20.0 |
| 3018 | Analog Output 2 Current Split-Lo | | | |
| 3019 | Analog Output 1 % Split-Hi | Read/Write | IEE FLOAT | 0.0..100.0 |
| 3020 | Analog Output 1 % Split-Lo | | | |
| 3021 | Analog Output 2 % Split-Hi | Read/Write | IEE FLOAT | 0.0..100.0 |
| 3022 | Analog Output 2 % Split-Lo | | | |
| 5001 | Analog Input 1 Raw | Read | UINT 32 | 0..8,388,607 |
| 5002 | Analog Input 2 Raw | Read | UINT 32 | 0..8,388,607 |
| 7001 | Analog Input 1 Current | Read | IEE FLOAT | 4.0..20.0 |
| 7002 | Analog Input 2 Current | Read | IEE FLOAT | 4.0..20.0 |
| 7003 | Analog Output 1 Current | Read/Write | IEE FLOAT | 4.0..20.0 |
| 7004 | Analog Output 2 Current | Read/Write | IEE FLOAT | 4.0..20.0 |
| 7005 | Analog Output 1 % | Read/Write | IEE FLOAT | 0.0..100.0 |
| 7006 | Analog Output 2 % | Read/Write | IEE FLOAT | 0.0..100.0 |

## 6.4 0-10 V I/O Module - Modbus Mapping Table

| HR | Description | Access | Type | Range |
|---|---|---|---|---|
| 3001 | Analog Input 1 Volts /1000 | Read | UINT 16 | 0..10,000 |
| 3002 | Analog Input 2 Volts /1000 | Read | UINT 16 | 0..10,000 |
| 3003 | Analog Input 1 Raw Split-Hi | Read | UINT 32 | 0..8,388,607 |
| 3004 | Analog Input 1 Raw Split-Lo | | | |
| 3005 | Analog Input 2 Raw Split-Hi | Read | UINT 32 | 0..8,388,607 |
| 3006 | Analog Input 2 Raw Split-Lo | | | |
| 3007 | Analog Input 1 Volts Split-Hi | Read | IEE FLOAT | 0.0..10.0 |
| 3008 | Analog Input 1 Volts Split-Lo | | | |
| 3009 | Analog Input 2 Volts Split-Hi | Read | IEE FLOAT | 0.0..10.0 |
| 3010 | Analog Input 2 Volts Split-Lo | | | |
| 3011 | Analog Output 1 Raw | Read/Write | UINT 16 | 0..65,535 |
| 3012 | Analog Output 2 Raw | Read/Write | UINT 16 | 0..65,535 |
| 3013 | Analog Output 1 Volts /1000, % /100 | Read/Write | UINT 16 | 0..10,000 |
| 3014 | Analog Output 2 Volts /1000, % /100 | Read/Write | UINT 16 | 0..10,000 |
| 3015 | Analog Output 1 Volts Split-Hi | Read/Write | IEE FLOAT | 0.0..10.0 |
| 3016 | Analog Output 1 Volts Split-Lo | | | |
| 3017 | Analog Output 2 Volts Split-Hi | Read/Write | IEE FLOAT | 0.0..10.0 |
| 3018 | Analog Output 2 Volts Split-Lo | | | |
| 3019 | Analog Output 1 % Split-Hi | Read/Write | IEE FLOAT | 0.0..100.0 |
| 3020 | Analog Output 1 % Split-Lo | | | |
| 3021 | Analog Output 2 % Split-Hi | Read/Write | IEE FLOAT | 0.0..100.0 |
| 3022 | Analog Output 2 % Split-Lo | | | |
| 5001 | Analog Input 1 Raw | Read | UINT 32 | 0..8,388,607 |
| 5002 | Analog Input 2 Raw | Read | UINT 32 | 0..8,388,607 |
| 7001 | Analog Input 1 Volts | Read | IEE FLOAT | 0.0..10.0 |
| 7002 | Analog Input 2 Volts | Read | IEE FLOAT | 0.0..10.0 |
| 7003 | Analog Output 1 Raw | Read/Write | IEE FLOAT | 0.0..65,535.0 |
| 7004 | Analog Output 2 Raw | Read/Write | IEE FLOAT | 0.0..65,535.0 |
| 7005 | Analog Output 1 Volts | Read/Write | IEE FLOAT | 0.0..10.0 |
| 7006 | Analog Output 2 Volts | Read/Write | IEE FLOAT | 0.0..10.0 |
| 7007 | Analog Output 1 % | Read/Write | IEE FLOAT | 0.0..100.0 |
| 7008 | Analog Output 2 % | Read/Write | IEE FLOAT | 0.0..100.0 |

# 7 Diagnostics

## 7.1 Radio Module

1. **Power LED (Left)**
    a. **Red**: Power on
    b. **LED not on**: No power
        i. Verify power supply wiring and polarity. (+ to 9-30V, - to COM)
        ii. Verify correct pin outs are used. (pin 11 for +, pin 10 or 12 for - )
        iii. Verify 9-30 VDC is supplied to the unit.

2. **I/O LED (Right)**:
   a. **Green**: USB enabled
   b. **LED not on**: No power
      i. Connect USB to PC first, then to I/O Expansion Module.
      ii. Verify unit is powered on, Power LED (left) should be red.
      iii. Verify the PC is on.

3. **Unable to Read/Write Modbus Values**
   a. Verify that the Modbus slave ID is the Module ID + 1

      **Example:** If the Module ID is 0, the Modbus slave ID will be 1
   b. Select MSB first when applicable when setting up Modbus Master device.
   c. Verify Modbus RS485 wiring (3-wire).
   d. Verify baud rate, data bits, parity, and stop bits (9600 / 8 / None / 1).
   e. Refer to Modbus Mapping (page 27).
      i. Verify the Modbus function code.
      ii. Verify the Modbus register address.
      iii. Verify the data type (integer/float, 16/32 bit).
      iv. Verify if address has read/write or only read function capabilities.

# 8 Frequently Asked Questions

1. What is the RS485 I/O Expansion System designed for?
   a. It is designed to easily and economically add local I/O points to any industrial monitoring or control system via RS485 Modbus connectivity.

2. What type of I/O's are available?
   a. Digital/discrete
   b. Analog 4-20 mA
   c. Analog 0-10 V

3. Does this System require software configuration?
   a. No, it requires absolutely no software.
   b. Slave ID switch on each I/O Module is used to set the Slave ID.
   c. The RS485 I/O Expansion Modules provides power and controls the I/O images.

4. How many I/O Modules can I connect to one RS485 expansion I/O system?
   a. Digital: up to 16
   b. 4-20 mA: up to 5
   c. 0-10 V: up to 8
   d. When mixing Modules, use Power Budget Calculator to determine max number of Modules per system: http://psft.com/A7U

5. Can I use the same I/O Modules with the WIO® Wireless System for replicating hardwire?
   a. Yes, the WIO I/O Modules can be used for both wireless and RS485 I/O applications

6. Do the I/O Modules require a firmware change when changing from RS485 to wireless application?
   a. No, the I/O Modules are designed to work with either the WIO® Radios or RS485 I/O Expansion Module.

7. How many I/O modules can be connected with the standard DataRail (6.1") shipped with RS485 Kit?
   a. Standard DataRail supports up to five (5) I/O modules in addition to one RS485 Module.

8. What is the mini USB port on the RS485 Module used for?
   a. For updating device firmware via PC.

9. Can the RS485 I/O Expansion System be used in hazardous locations?
   a. Yes, the system can be used in Class 1, Division 2 or Zone 2 locations. Certification pending.

10. How can I obtain tech support or RMA?
    a. Please email us at support@prosoft-technology.com or give us a call to begin the service process. You will be guided by our helpful customer service staff member to help you get through any issue you are having with the Wireless I/O System.

# 9 Support, Service & Warranty

ProSoft Technology, Inc. (ProSoft) is committed to providing the most efficient and effective support possible. Before calling, please gather the following information to assist in expediting this process:

1. Product Version Number
2. System architecture
3. Network details

If the issue is hardware related, we will also need information regarding:

1. Module configuration and associated ladder files, if any
2. Module operation and any unusual behavior
3. Configuration/Debug status information
4. LED patterns
5. Details about the serial, Ethernet or fieldbus devices interfaced to the module, if any.

**Note:** *For technical support calls within the United States, an after-hours answering system allows 24-hour/7-days-a-week pager access to one of our qualified Technical and/or Application Support Engineers. Detailed contact information for all our worldwide locations is available on the following page.*

| | |
|---|---|
| **Internet** | Web Site: www.prosoft-technology.com/support<br>E-mail address: support@prosoft-technology.com |
| **Asia Pacific**<br>(location in Malaysia) | Tel: +603.7724.2080, E-mail: asiapc@prosoft-technology.com<br>Languages spoken include: Chinese, English |
| **Asia Pacific**<br>(location in China) | Tel: +86.21.5187.7337 x888, E-mail: asiapc@prosoft-technology.com<br>Languages spoken include: Chinese, English |
| **Europe**<br>(location in Toulouse, France) | Tel: +33 (0) 5.34.36.87.20,<br>E-mail: support.EMEA@prosoft-technology.com<br>Languages spoken include: French, English |
| **Europe**<br>(location in Dubai, UAE) | Tel: +971 (0)4.214.6911,<br>E-mail: mea@prosoft-technology.com<br>Languages spoken include: English, Hindi |
| **North America**<br>(location in California) | Tel: +1 661-716-5100,<br>E-mail: support@prosoft-technology.com<br>Languages spoken include: English, Spanish |
| **Latin America**<br>(Oficina Regional) | Tel: +1-281-298-9109,<br>E-Mail: latinam@prosoft-technology.com<br>Languages spoken include: Spanish, English |
| **Latin America**<br>(location in Puebla, Mexico) | Tel: +52-222-399-6565,<br>E-mail: soporte@prosoft-technology.com<br>Languages spoken include: Spanish |
| **Brasil**<br>(location in Sao Paulo) | Tel: +55-11-5083-3776,<br>E-mail: brasil@prosoft-technology.com<br>Languages spoken include: Portuguese, English |

## 9.1 Warranty Information

For complete details regarding ProSoft Technology's TERMS & CONDITIONS OF SALE, WARRANTY, SUPPORT, SERVICE AND RETURN MATERIAL AUTHORIZATION INSTRUCTIONS please see the documents on the Product DVD or at www.prosoft-technology.com/warranty.

All documentation is subject to change without notice.